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L6: Entry 15 of 27

File: USPT

Jan 11, 1994

DOCUMENT-IDENTIFIER: US 5277823 A
TITLE: Silica scale inhibition

Detailed Description Paragraph Right (6):

We have found that the preferred additives are (1) terpolymers of acrylic acid, AMPS and a substituted acrylamide, vinyl acetate, styrene or styrene sulfonic acid (2) copolymers of maleic acid and styrene sulfonic acid and (3) magnesium chloride. Most preferred is the terpolymer of 45 to 67 percent acrylic acid, 17 to 40 percent AMPS and 5-30 percent of tertiary butyl acrylamide, vinyl acetate, styrene or styrene sulfonic acid.

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L6: Entry 15 of 27

File: USPT

Jan 11, 1994

US-PAT-NO: 5277823

DOCUMENT-IDENTIFIER: US 5277823 A

TITLE: Silica scale inhibition

DATE-ISSUED: January 11, 1994

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Hann; William M.	Gwynedd	PA		
Bardsley; Judy H.	Salford	PA		
Robertson; Susan T.	Ambler	PA		
Shulman; Jan E.	Newtown	PA		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Rohm and Haas Company	Philadelphia	PA			02

APPL-NO: 8/ 005411 [PALM]

DATE FILED: January 19, 1993

PARENT-CASE:

RELATED APPLICATIONS This is a continuation of U.S. application Ser. No. 07/805,434, filed Dec. 11, 1991, now abandoned which was a continuation-in-part of U.S. application Ser. No. 07/527,420, filed May 23, 1990, now abandoned.

INT-CL: [5] C02F 5/08

US-CL-ISSUED: 210/696; 60/641.2, 127/61, 166/244.1, 210/698, 210/701, 252/175, 252/180, 252/181

US-CL-CURRENT: 210/696; 127/61, 166/244.1, 210/698, 210/701, 252/175, 252/180, 252/181, 60/641.2

FIELD-OF-SEARCH: 166/244.1, 166/310, 210/696-701, 252/82, 252/180, 252/181, 252/175, 60/641.2, 127/61

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

 [Search Selected](#) [Search ALL](#)

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/> <u>2723956</u>	November 1955	Johnson	210/698
<input type="checkbox"/> <u>4288327</u>	September 1981	Godlewski et al.	210/698
<input type="checkbox"/> <u>4584104</u>	April 1986	Dubin	210/696
<input type="checkbox"/> <u>4797223</u>	January 1989	Amick et al.	210/701
<input type="checkbox"/> <u>4830766</u>	May 1989	Gallup et al.	210/696
<input type="checkbox"/> <u>4913823</u>	April 1990	Lipinski et al.	252/180
<input type="checkbox"/> <u>4933090</u>	June 1990	Gill et al.	210/700
<input type="checkbox"/> <u>4936987</u>	June 1990	Persinski et al.	210/701
<input type="checkbox"/> <u>4952326</u>	August 1990	Amjad et al.	210/701
<input type="checkbox"/> <u>5078879</u>	January 1992	Gill et al.	210/701

FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
3743739	July 1989	DEX	

ART-UNIT: 138

PRIMARY-EXAMINER: Hruskoci; Peter A.

ATTY-AGENT-FIRM: Banchik; David T. Vouros; James G.

ABSTRACT:

A method for inhibiting silica scale formation in aqueous systems using selected low molecular weight (meth)acrylic or maleic acid based copolymers or terpolymers, magnesium ion alone, or the selected copolymers and terpolymers with aluminum ion or magnesium ion, or polyacrylic or polymaleic acid with aluminum ion or magnesium ion.

15 Claims, 0 Drawing figures

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L6: Entry 27 of 27

File: DWPI

Apr 12, 1989

DERWENT-ACC-NO: 1989-108056

DERWENT-WEEK: 198915

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TITLE: Stabilising metal ions and dispersing particulates - in aq. medium, by adding a copolymer and a phosphorus cpd.

INVENTOR: AMJAD, Z; MASLER, W F

PATENT-ASSIGNEE: GOODRICH CO B F (GOOR)

PRIORITY-DATA: 1987US-0105938 (October 8, 1987)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
EP 311072 A	April 12, 1989	E	014	
JP 01130794 A	May 23, 1989		000	

DESIGNATED-STATES: AT BE CH DE ES FR GB GR IT LI LU NL SE

CITED-DOCUMENTS: A3...8923; EP 71323 ; FR 2337694 ; GB 2150942 ; No-SR.Pub ; US 4552665 ; US 4640793

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
EP 311072A	October 6, 1988	1988EP-0116565	
JP01130794A	October 7, 1988	1988JP-0252176	

INT-CL (IPC): C02F 5/08; C23F 11/18

ABSTRACTED-PUB-NO: EP 311072A

BASIC-ABSTRACT:

Stabilising metal ions and/or dispersing particulate matter in an aq. medium is claimed by adding in wt. ratio 10:1 - 1:10 : (I) water-soluble copolymer, mol. wt. 1000-50000, contg. at least 30 wt.% unsatd. 3-5C mono-/di-carboxylic acid(s) (salt(s)) (Ia); and (II) water-soluble phosphorus cpd. selected from (mixt.) phosph(on)ates.

Copolymer with pref. mol. wt. 2000-20000 comprises 50-90 wt.% (Ia) plus other comonomer(s) selected from (mixts.) unsatd. 3-5C mono-/di-carboxylic acids (e.g. (meth)acrylic/itaconic/maleic); acrylamides, opt. substd. with H/1-12C (un)substd. alkyl; alkylacrylates, opt. substd. with carboxy/sulpho/keto; hydroxy-/alkoxy-alkylacrylates; 6-8C allyloxy hydroxyalkane sulphonic acids; styrene sulphonic acids; acrylamidoalkane sulphonic acids; vinyl-/hydrolysed carboxylates, and their water-sol. salts and 1-6C alkyl esters.

Pref. contain at least 3 comonomers including 50-90 wt.% acrylic acid and pref. (meth)acrylamidoalkane sulphonic acid (salt). These include: AA:MAA:t-BuAm 60:20:20; AA:MAA:Am:CA 54:21:9:16; AA:AM:AMPS 60:20:20; and AA:MAA:AMPS:t-BuAm 60:20:10:10. (where (M)AA = (meth)acrylic acid, t-BuAm = t-butylacrylamide, AMPS = 2-acrylamide-2-methylpropane sulphonic acid and CA = carbitol acrylate).

Aq. soln. polymerised at 30-130 deg. C and having concn. 5-50 wt.% (based on total solids), has final pH 2-8 and is used as 0.05-500 ppm.

USE/ADVANTAGE - Admixt. acts synergistically to stabilise metal ions, inhibit scale and disperse particulates in water systems including cooling/boiler water, desalination-plant brine solns., reverse-osmosis process membrane devices and oil-field applications.

ABSTRACTED-PUB-NO: EP 311072A

EQUIVALENT-ABSTRACTS:

CHOSEN-DRAWING: Dwg.0/0

DERWENT-CLASS: A97 D15 H01 J01

CPI-CODES: A04-F04; A04-F05; A12-W11J; D04-A01E; D04-A03A; D04-B03; D04-B07F; H01-D06; J02-A03;

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L9: Entry 2 of 2

File: DWPI

Apr 8, 1992

DERWENT-ACC-NO: 1992-116016

DERWENT-WEEK: 199731

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TITLE: Absorbent copolymers with high absorbency - are crosslinked copolymers of ion pair monomer contg. ammonium cation and sulphonate anion and comonomer

Equivalent Abstract Text:

A polymer suitable for use as an absorbent of an aqueous electrolyte solution, said polymer being formed by copolymerization of the following components: (a) an ampholytic ion pair monomer comprising (i) the ammonium cation which is 3-methacrylamidopropyltrimethylammonium, 2-methacryloyloxyethyltrimethylammonium or 2-methacryloyloxyethyltrimethylammonium and (ii) a sulphonate anion which is 2-acrylamido-2-methylpropane sulphonate, 2-methacryloyloxyethane sulphonate, vinyl sulphonate, styrene sulphonate or a combination of two or more thereof, and (b) at least one comonomer which is acrylamide, methacrylamide, acrylonitrile, acrylic acid, methacrylic acid, an alkali salt of acrylic acid, an alkali salt of methacrylic acid, 2-acrylamido-2-methylpropane sulphonate, and alkali salt of 2-acrylamido-2-methylpropane sulphonate, 2-methacryloyloxyethane sulphonate, an alkali salt of 2-methacryloyloxyethane sulphonate, N-vinyl-2-pyrrolidone, or an amine corresponding to said ammonium cation in (a), namely 3-methacrylamidopropyltrimethylamine, 2-methacryloyloxyethyltrimethylamine, or 2-methacryloyloxyethyltrimethylamine, respectively, or a combination of two or more of said comonomers; and wherein there is further included, (c) a crosslinking agent which has at least two polymerisable olefinic functionalities wherein each of the olefinic functionalities is suitable for crosslinking with polymer chains formed from components (a) and (b) or (c) a polymer which is a polysaccharide polypropylene, or polyethylene onto which the comonomer (b) is graft polymerised and with which there is further graft copolymerised the ampholytic ion pair monomer (a); wherein the comonomer component (b) and the ion pair monomer component (a) are provided in amounts which are effective to produce a highly absorbent copolymer.

Equivalent Abstract Text:

A novel polymer which is highly absorbent to aq. electrolyte solns. is formed by copolymerisation of (A) an ampholytic ion-pair monomer comprising (i) a 3-methacrylamidopropyltrimethylammonium (MPDMA) cation and (ii) a sulphonate anion which is 2-acrylamido-2-methylpropane sulphonate (AMPS), 2-methacryloyloxyethane sulphonate, vinyl sulphonate and/or styrene sulphonate; a comonomer comprising (meth)acrylamide, acrylonitrile, (meth)acrylic acid (or alkali salts) and/or N-vinyl-2-pyrrolidone; and (C) one or more crosslinkers with at least 2 polymerisable olefinic functionalities, each of which is suitable for crosslinking.

Equivalent Abstract Text (1):

A polymer suitable for use as an absorbent of an aqueous electrolyte solution, said polymer being formed by copolymerization of the following components: (a) an ampholytic ion pair monomer comprising (i) the ammonium cation which is 3-methacrylamidopropyltrimethylammonium, 2-methacryloyloxyethyltrimethylammonium or 2-methacryloyloxyethyltrimethylammonium and (ii) a sulphonate anion which is 2-acrylamido-2-methylpropane sulphonate, 2-methacryloyloxyethane sulphonate, vinyl sulphonate, styrene sulphonate or a combination of two or more thereof, and (b) at least one comonomer which is acrylamide, methacrylamide, acrylonitrile, acrylic acid, methacrylic acid, an alkali salt of acrylic acid, an alkali salt of methacrylic acid, 2-acrylamido-2-methylpropane sulphonate, and alkali salt of 2-acrylamido-2-methylpropane sulphonate, 2-methacryloyloxyethane sulphonate, an alkali salt of 2-methacryloyloxyethane sulphonate, N-vinyl-2-pyrrolidone, or an

amine corresponding to said ammonium cation in (a), namely 3-methacrylamidopropyldimethylamine, 2-methacryloyloxyethyldimethylamine, or 2-methacryloyloxyethyldiethylamine, respectively, or a combination of two or more of said comonomers; and wherein there is further included, (c) a crosslinking agent which has at least two polymerisable olefinic functionalities wherein each of the olefinic functionalities is suitable for crosslinking with polymer chains formed from components (a) and (b) or (c) a polymer which is a polysaccharide polypropylene, or polyethylene onto which the comonomer (b) is graft polymerised and with which there is further graft copolymerised the ampholytic ion pair monomer (a); wherein the comonomer component (b) and the ion pair monomer component (a) are provided in amounts which are effective to produce a highly absorbent copolymer.

Equivalent Abstract Text (2):

A novel polymer which is highly absorbent to aq. electrolyte solns. is formed by copolymerisation of (A) an ampholytic ion-pair monomer comprising (i) a 3-methacrylamidopropyldimethylammonium (MPDMA) cation and (ii) a sulphonate anion which is 2-acrylamido-2-methylpropane sulphonate (AMPS), 2-methacryloyloxy ethane sulphonate, vinyl sulphonate and/or styrene sulphonate; a comonomer comprising (meth)acrylamide, acrylonitrile, (meth)acrylic acid (or alkali salts) and/or N-vinyl-2-pyrro lidone; and (C) one or more crosslinkers with at least 2 polymerisable olefinic functionalities, each of which is suitable for crosslinking.

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L9: Entry 2 of 2

File: DWPI

Apr 8, 1992

DERWENT-ACC-NO: 1992-116016

DERWENT-WEEK: 199731

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TITLE: Absorbent copolymers with high absorbency - are crosslinked copolymers of ion pair monomer contg. ammonium cation and sulphonate anion and comonomer

INVENTOR: AHMED, I; HSIEH, H L ; HSIEH, H

PATENT-ASSIGNEE: PHILLIPS PETROLEUM CO (PHIP)

PRIORITY-DATA: 1991US-0665880 (March 7, 1991), 1990US-0591301 (October 1, 1990), 1990US-0596180 (October 12, 1990), 1990US-0607005 (October 31, 1990), 1990US-0632226 (December 20, 1990), 1991US-0653581 (February 11, 1991), 1991US-0761572 (September 18, 1991), 1992US-0917700 (July 21, 1992), 1992US-0919075 (July 23, 1992), 1992US-0919073 (July 23, 1992), 1992US-0918307 (July 21, 1992), 1993US-0065721 (May 21, 1993), 1993US-0065829 (May 21, 1993), 1993US-0126279 (September 24, 1993), 1991US-0761569 (September 18, 1991), 1993US-0053038 (April 26, 1993), 1994US-0280955 (July 27, 1994)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
EP 479245 A	April 8, 1992		049	
ES 2100190 T3	June 16, 1997		000	C08F246/00
US 5098970 A	March 24, 1992		012	
US 5106929 A	April 21, 1992		012	
US 5110887 A	May 5, 1992		010	
CA 2043662 A	April 2, 1992		000	B01J020/26
CA 2044776 A	April 13, 1992		000	B01J020/26
CA 2043661 A	May 1, 1992		000	B01J020/26
US 5130389 A	July 14, 1992		014	C08F228/02
US 5206326 A	April 27, 1993		011	C08G063/48
US 5214117 A	May 25, 1993		011	C08G063/48
US 5219970 A	June 15, 1993		011	C08G063/48
JP 05132528 A	May 28, 1993		031	C08F220/34
EP 479245 A3	October 28, 1992		000	
TW 213928 A	October 1, 1993		000	C08F251/00
US 5286827 A	February 15, 1994		013	C08F228/00
US 5290870 A	March 1, 1994		011	C08F255/00
US 5290871 A	March 1, 1994		011	C08F255/00
US 5331021 A	July 19, 1994		010	A61F013/15
US 5354806 A	October 11, 1994		012	A61L015/24
US 5357000 A	October 18, 1994		009	C08F255/02
US 5439983 A	August 8, 1995		010	C08F255/02
CA 2043661 C	August 27, 1996		000	B01J020/26
CA 2043662 C	August 27, 1996		000	B01J020/26
CA 2044776 C	August 27, 1996		000	B01J020/26
EP 479245 B1	March 5, 1997	E	073	C08F246/00
DE 69124903 E	April 10, 1997		000	C08F246/00

DE 69124903 E

April 10, 1997

000

C08F246/00

DESIGNATED-STATES: AT BE CH DE DK ES FR GB GR IT LI LU NL SE AT BE CH DE DK ES FR GB IT LI NL

CITED-DOCUMENTS: No-SR.Pub; 1.Jnl.Ref ; EP 191980 ; EP 68189 ; FR 2582663 ; GB 1524899 ; JP02215815

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
ES 2100190T3	October 1, 1991	1991EP-0116779	
ES 2100190T3		EP 479245	Based on
US 5098970A	October 31, 1990	1990US-0607005	
US 5098970A	March 7, 1991	1991US-0665880	
US 5106929A	October 1, 1990	1990US-0591301	
US 5110887A	October 31, 1990	1990US-0607005	
CA 2043662A	May 31, 1991	1991CA-2043662	
CA 2044776A	June 17, 1991	1991CA-2044776	
CA 2043661A	May 31, 1991	1991CA-2043661	
US 5130389A	October 12, 1990	1990US-0596180	
US 5206326A	March 7, 1991	1991US-0665880	Cont of
US 5206326A	July 21, 1992	1992US-0917700	
US 5214117A	December 20, 1990	1990US-0632226	Cont of
US 5214117A	July 23, 1992	1992US-0919075	
US 5219970A	February 11, 1991	1991US-0653581	Cont of
US 5219970A	July 23, 1992	1992US-0919073	
JP05132528A	October 1, 1991	1991JP-0253903	
EP 479245A3	October 1, 1991	1991EP-0116779	
TW 213928A	October 3, 1991	1991TW-0107804	
US 5286827A	October 12, 1990	1990US-0596180	Div ex
US 5286827A	July 21, 1992	1992US-0918307	
US 5286827A		US 5130389	Div ex
US 5290870A	February 11, 1991	1991US-0653581	Cont of
US 5290870A	July 23, 1992	1992US-0919073	Div ex
US 5290870A	May 21, 1993	1993US-0065721	
US 5290870A		US 5219970	Div ex
US 5290871A	December 20, 1990	1990US-0632226	Cont of
US 5290871A	July 23, 1992	1992US-0919075	Div ex
US 5290871A	May 21, 1993	1993US-0065829	
US 5290871A		US 5214117	Div ex
US 5331021A	December 20, 1990	1990US-0632226	Cont of
US 5331021A	July 23, 1992	1992US-0919075	Div ex
US 5331021A	May 21, 1993	1993US-0065829	Div ex
US 5331021A	September 24, 1993	1993US-0126279	
US 5331021A		US 5214117	Div ex
US 5331021A		US 5290871	Div ex
US 5354806A	October 1, 1990	1990US-0591301	Div ex
US 5354806A	September 18, 1991	1991US-0761569	
US 5354806A		US 5106929	Div ex
US 5357000A	March 7, 1991	1991US-0665880	Cont of
US 5357000A	July 21, 1992	1992US-0917700	Div ex
US 5357000A	April 26, 1993	1993US-0053038	
US 5357000A		US 5206326	Div ex
US 5439983A	March 7, 1991	1991US-0665880	Cont of
US 5439983A	July 21, 1992	1992US-0917700	Div ex

US 5439983A	April 26, 1993	1993US-0053038	Div ex
US 5439983A	July 27, 1994	1994US-0280955	
US 5439983A		US 5206326	Div ex
US 5439983A		US 5357000	Div ex
CA 2043661C	May 31, 1991	1991CA-2043661	
CA 2043662C	May 31, 1991	1991CA-2043662	
CA 2044776C	June 17, 1991	1991CA-2044776	
EP 479245B1	October 1, 1991	1991EP-0116779	
DE69124903E	October 1, 1991	1991DE-0624903	
DE69124903E	October 1, 1991	1991EP-0116779	
DE69124903E		EP 479245	Based on

5290870 A INT-CL (IPC) : A61F 13/00; A61F 13/15; A61F 13/20; A61L 15/00; A61L 15/24; A61L 15/28; B01D 15/04; B01J 20/26; C02F 1/28 ; C08F 12/30; C08F 220/06; C08F 220/34; C08F 220/38; C08F 220/44; C08F 220/60; C08F 228/00; C08F 228/02; C08F 246/00; C08F 251/00; C08F 251/02; C08F 255/00; C08F 255/02; C08F 265/00; C08F 267/00; C08F 273/00; C08G 63/48; C08G 63/91; C08J 3/24; C08K 5/19; D21F 11/00; D21H 11/00; D21H 17/45

RELATED-ACC-NO: 1992-184035

ABSTRACTED-PUB-NO: EP 479245A

BASIC-ABSTRACT:

Polymer is formed by copolymerisation of (a) an ampholytic ion pair monomer comprising (i) the ammonium cation, 3-methacrylamidopropyldimethyl ammonium (I), 2-methacryloxyoxyethylidimethylammonium (II) or 2-methacryloxyoxydiethyl-ammonium (III) and (i) a sulphonate anion which is 2-acryl-ami do-2-methyl -propane-sulphonate (IV), 2-methacryloyloxyethane sulphonate (V), vinyl sulphonate (VI), styrene sulphonate (VII) or a combination of two or more of these and (b) at least one comonomer which is acrylamide (VIII), methacrylamide (IX), acrylonitrile (X), (meth)acrylic acid (XI), an alkali salt of (meth)acrylic acid (XII), 2-acrylamido-2-methylpropane sulphonic acid (XIII), an alkali salt of 2-acrylamido-2-methylpropane sulphonic acid (XIV), 2-methacryloyloxy-ethane sulphonic acid (XV), an alkali salt of 2-methacryloyloxyethane sulphonic acid (XVI), N-vinyl-2-pyrrolidone (XVII), or an amine corresponding to the ammonium cation in (a), namely 3-methacrylamidopropyldimethylamine (XVIII), 2-methacryloyloxyethylidimethylamine (XIX) or 2-methacryloyloxydiethylamine (XX), or a combination of two or more of these monomers, together with (c) a crosslinking agent having at least two polymerisable olefinic functionalities each suitable for crosslinking with polymer chains formed from components (a) and (b) or (c') a polymer which is a polysaccharide, polypropylene, or polyethylene onto which the comonomer (b) is graft polymerised and with which there is further copolymerised the ampholytic ion pair monomer (a).

USE/ADVANTAGE - The polymers exhibit high absorbency w.r.t. aq. electrolyte solns., and are esp. useful to improve the water absorbency of paper towels and disposable diapers.

ABSTRACTED-PUB-NO: EP 479245B

EQUIVALENT-ABSTRACTS:

A polymer suitable for use as an absorbent of an aqueous electrolyte solution, said polymer being formed by copolymerization of the following components: (a) an ampholytic ion pair monomer comprising (i) the ammonium cation which is 3-methacrylamidopropyldimethylammonium, 2-methacryloyloxyethylidimethylammonium or 2-methacryloyloxyethylidimethylammonium and (ii) a sulphonate anion which is 2-acrylamido-2-methylpropane sulphonate, 2-methacryloyloxyethane sulphonate, vinyl sulphonate, styrene sulphonate or a combination of two or more thereof, and (b) at least one comonomer which is acrylamide, methacrylamide, acrylonitrile, acrylic acid, methacrylic acid, an alkali salt of acrylic acid, an alkali salt of methacrylic acid, 2-acrylamido-2-methylpropane sulphonic acid, and alkali salt of 2-acrylamido-2-methylpropane sulphonic acid, 2-methacryloyloxyethane sulphonic acid, an alkali salt of 2-methacryloyloxyethane sulphonic acid, N-vinyl-2-pyrrolidone, or an amine corresponding to said ammonium cation in (a), namely 3-methacrylamidopropyldimethylamine, 2-methacryloyloxyethylidimethylamine, or 2-methacryloyloxyethylidimethylamine, respectively, or a combination of two or more of said comonomers; and wherein there is further included, (c) a crosslinking agent which has at least two polymerisable olefinic functionalities wherein each of the olefinic

functionalities is suitable for crosslinking with polymer chains formed from components (a) and (b) or (c) a polymer which is a polysaccharide polypropylene, or polyethylene onto which the comonomer (b) is graft polymerised and with which there is further graft copolymerised the amphotolytic ion pair monomer (a); wherein the comonomer component (b) and the ion pair monomer component (a) are provided in amounts which are effective to produce a highly absorbent copolymer.

US 5098970A

A novel polymer which is highly absorbent to aq. electrolyte solns. is formed by copolymerisation of (A) an amphotolytic ion-pair monomer comprising (i) a 3-methacrylamidopropyl dimethylammonium (MPDMA) cation and (ii) a sulphonate anion which is 2-acrylamido-2-methylpropane sulphonate (AMPS), 2-methacryloyloxy ethane sulphonate, vinyl sulphonate and/or styrene sulphonate; a comonomer comprising (meth)acrylamide, acrylonitrile, (meth)acrylic acid (or alkali salts) and/or N-vinyl-2-pyrro lidone; and (C) one or more crosslinkers with at least 2 polymerisable olefinic functionalities, each of which is suitable for crosslinking.

A wide range of such copolymers is claimed in which (B) is the major component (eg 65-99 mol.% depending on the comonomer) and the amt. of (C) is eg 0.01-0.3 mols. per 100 mols. of (A)+(B).

USE/ADVANTAGE - Absorption of tap water, salt water, brine or urine using the copolymer is claimed. Typical uses are in improving the absorbency of paper towels or disposable diapers. The components of the copolymer act synergistically to increase water absorbency, with absorbencies of 70-91g/g of synthetic urine being achievable as compared to only 56g/g for the best known materials.

US 5106929A

Polymer is formed by copolymerisation of (a) an amphotolytic ion pair monomer comprising (i) 2-methacryloyloxyethyl diethylammonium as NH_x-cation and (ii) sulphonate anion; (b) 1 or more comonomer; and (iii) 1 or more crosslinking agent contg. 2 or more polymerisable olefinic functionalities for crosslinking.

Cpd. (ii) is 2-crylamido-2-methylpropane sulphonate, 2-methacryloyloxyethane sulphonate, vinyl sulphonate, and/or styrene sulphonate. Cpd. (b) is (meth)acrylamide, acrylonitrile, (meth)acrylic acid, methacrylic acid salt, and/or N-vinyl-2-pyrrolidone.

USE - To absorb 70g or more of synthetic urine per g. of polymer, e.g. to improve water absorbency of paper towels and disposable diapers.

US 5110887A

Paper towel or disposable diaper is mfd. contg. a polymer formed by the copolymerisation of (a) an amphotolytic ion pair monomer; (b) 1 or more comonomer; and (c) 1 or more crosslinking agent contg. 2 or more polymerisable olefinic gps.

Cpd. (a) comprises (i) an ammonium cation 3-methacrylamido-propyl dimethylammonium and (ii) 2-acrylamido-2-methylpropane sulphonate, 2-methacryloyloxyethane sulphonate, vinyl sulphonate, and/or styrene sulphonate. Cpd. (b) comprises (meth)acrylamide, acrylonitrile, (meth)acrylic acid (alkali salt), and/or N-vinyl-2-pyrrolidone.

ADVANTAGE - Is highly absorbent to aq. electrolyte solns.

US 5130389A

Polymer formed by the copolymerisation of (a) an amphotolytic ion pair monomer comprising (i) the ammonium cation 2-methacryloyloxyethyl dimethylammonium and (ii) a sulphonate anion from 2-acrylamido-2-methylpropane sulphonate, 2-methacryloyloxyethane sulphonate, vinylsulphonate, styrene sulphonate and mixts.; (b) comonomer(s) of acrylamide and/or methacrylamide; and (c) crosslinking agent(s) which has two or more polymerisable olefinic functionalities where each of the olefinic functionalities is suitable for crosslinking; and the polymer comprises a polymer formed by the polymerisation of: (a) 3-50 mol.%, pref. 5-50 mol.% of the amphotolytic ion pair monomer, and (b) 50-97 mol.%, pref. 50-95 mol.% of the comonomer; and (c) 0.01-0.3 mole, pref. 0.01-0.2 mole of the crosslinking agent per 100 mole of the amphotolytic ion pair monomer and the comonomer.

USE - Paper towels and disposable diapers are mfd. from the superabsorbant copolymers. Highly absorbent to aq. electrolyte solns. (claimed)

US 5206326A

Graft copolymer is formed by: (a) graft polymerising onto a first polymer selected from polysaccharide, pp and pe: at least one comonomer selected from eg. (meth)acrylamide, acrylonitrile, (meth)acrylic acid, 2-methacryloxyethyl-diethylamine etc., (b) graft copolymerising an ampholytic ion pair monomer having an NH4 (plus) and a sulphonate anion, where (i) the cation is 2-methacryloyloxy ethyldiethylammonium; and (II) the sulphonate anion is selected from e.g. 2-acrylamido-2-methylpropane sulphonate, 2-methacryloyloxyethane sulphonate, vinyl sulphonate etc. where the comonomers and ion pair monomers are provided in ams. which are effective to produce a highly absorbent graft copolymer; and (c) partially saponifying neutralisation of the graft copolymer formed in (b). USE/ADVANTAGE - The polymers are used for absorbing aq. electrolyte solns. in numerous commercial and industrial applications e.g. used to improve the water adsorbency of paper towels and disposable diapers

US 5214117A

Graft copolymer is formed by (a) graft polymerising 1 or more comonomer (e.g. acrylamide, methacrylamide, acrylonitrile, acrylic acid, etc.) onto polysaccharide, polypropylene or polyethylene; (b) graft polymerising an ampholytic ion pair monomer contg. an ammonium-cation and sulphonate-a nion to form highly absorbent graft copolymer; and (c) partially saponifying neutralisation of prod.

Ammonium action is 2-methacryloxyethyltrimethylammonium, and the sulphonate is 2-acrylamido-2-methylpropane sulphonate, 2-methacryloyloxyethane sulphate, vinyl sulphonate, and/or styrene sulphonate.

USE - To improve water absorbency of paper towels and disposable diapers

US 5219970A

Graft copolymers are formed by: (a) graft polymerising at least 1 comonomer (I) on to a first polymer (II); (b) graft polymerising the prod. with an ampholytic ion pair monomer having an ammonium cation (III) and a sulphonate anion (IV); and (C) partially saponifying the prod..

(II) is polysaccharide, polypropylene or polyethylene. (I) is (meth)acrylamide, acrylonitrile, (meth)acrylic acid or its alkali metal salts, 2-methacryloyloxyethyl-trimethylamine, 2-acrylamido-2-methylpropane sulphonate acid or its alkali metal salts, 2-methacryloyloxyethane sulphonate acid or its alkali metal salts or N-vinyl-2-pyrrolidone. (III) is 2-methacryloyloxyethyl trimethylammonium. (IV) is 2-acrylamido-2- methylpropane sulphonate, vinyl sulphate or styrene sulphonate.

USE - In improving the water absorbency of paper towels and disposable diapers

US 5286827A

Aq. electrolyte solns. are absorbed by contacting a polymer with the soln. The polymer is formed by copolymerisation of an ampholytic monomer (I) and a comonomer (II) with at least one crosslinking agent (III).

(I) is 2 - methacryloyloxyethyl dimethyl ammonium 2-acrylamido-2-methylpropane sulphonate, 2-methacryloyloxy ethane sulphonate, vinyl sulphonate and/or styrene sulphonate. (II) is (meth)acrylamide, acrylonitrile, (meth)acrylic acid, alkali (meth)acrylate, alkali 2-methacryloyloxyethane sulphonate and/or N-vinyl-2-pyrrolidone. (III) has at least two polymerisable olefinic gps. suitable for crosslinking.

USE/ADVANTAGE - Polymers are used to increase the absorbency of paper towels, disposable diapers, etc.

US 5290870A

The graft copolymer is formed by (A) graft polymerising onto a first polymer of polypropylene, comonomer(s) from (meth)acrylamide, acrylonitrile, (meth)acrylic acid, alkali salts of (meth)acrylic acid, 2-methacrylamido-2-propyltrimethylamine,

2-acrylamido-2-methylpropane sulphonic acid and alkali salts, 2-methacryloyloxyethane sulphonic acid and alkali salts, N-vinyl-2-pyrrolidone; and (B) graft copolymerising an amphotolytic ion pair monomer having an ammonium cation and a sulphonate anion where (i) the ammonium cation is 3-methylacrylamidopropylidimethyl-ammonium, (ii) the sulphonate anion is from one or more of 2-acrylamido-2-methylpropane sulphonate, 2-methacryloyloxyethane sulphonate, vinyl sulphonate and styrene sulphonate; the comonomers and ion pair monomers are provided in amts. which are effective to produce a highly absorbent graft copolymer; and (C) partially saponifying neutralisation of the graft copolymer formed in (B).

USE/ADVANTAGE - Paper towels and disposable diapers are mfd. from the copolymer. Improved absorbency.

US 5290871A

The graft copolymer is formed by (A) graft polymerising onto a first polymer of polypropylene, comonomer(s) from (meth)acrylamide, acrylonitrile, (meth)acrylic acid, alkali salts of (meth)acrylic acid, 2-methacryloyloxyethyldimethylamine, 2-acrylamido-2-methylpropane sulphonic acid and alkali salts and N-vinyl-2-pyrrolidone; and (B) graft copolymerising with an amphotolytic ion pair monomer having an ammonium cation and a sulphonate anion where (i) the ammonium cation is 2-methacryloyloxyethyldimethylammonium, and (ii) the sulphonate anion is one or more of 2-acrylamido-2-methylpropane sulphonate, 2-methacryloyloxyethane sulphonate, vinyl sulphonate and styrene sulphonate; the comonomers and ion pair monomers are provided in amts. which are effective to produce a highly absorbent graft copolymer; and (C) partially saponifying neutralisation of the graft copolymer formed in (B).

USE/ADVANTAGE - Paper towels and disposable diapers are mfd. from the polymer. Improved absorbency.

US 5331021A

The paper towel contg. a graft copolymer is formed by (a) graft polymerising onto a first polymer selected from polysaccharide, polypropylene, and polyethylene, comonomer(s) from (meth)acrylamide, acrylonitrile, (meth)acrylic acid, alkali salts of (meth)acrylic acid, (alkali salts of) 2-methacryloyloxyethane sulphonic acid, N-vinyl-2-pyrrolidone and combinations of two or more of them; (b) graft copolymerising with an amphotolytic ion pair monomer having an ammonium cation and a sulphonate anion where (i) the ammonium cation is 2-methacryloyloxyethyldimethylammonium and (ii) the sulphonate anion is from 2-acrylamido-2-methylpropane sulphonate, 2-methacryloyloxyethane sulphonate, vinyl sulphonate, styrene sulphonate or any combination. The comonomers and ion pair monomers are provided in amts. which are effective to produce a highly absorbent graft copolymer.

USE/ADVANTAGE - Used as paper towels and disposable diapers. Towels have improved absorbency.

US 5354806A

Paper towel or disposable diaper contains polymer formed by copolymerisation of (a) an amphotolytic ion pair monomer; (b) (meth)acrylamide, acrylonitrile, (meth)acrylic acid (or its alkali metal salt), and/or N-vinyl-2-pyrrolidone; and (c) 1 or more crosslinking agent contg. 2 or more polymerisable olefinic functionalities.

Monomer (a) comprises (i) cationic 2-methacryloyloxyethyldimethylammonium and (ii) 2-acrylamido-2-methylpropane sulphonate, 2-methacryloyloxyethane sulphonate, vinyl sulphonate, and/or styrene sulphonate

ADVANTAGE - Polymer present is highly absorbent to aq. electrolyte solns.

US 5357000A

Graft copolymer is formed by (a) graft polymerising 75-90 mol. % of comonomer onto 1-50 wt. % of polypropylene; (b) graft copolymerising 2-25 mol. % of amphotolytic ion pair monomer contg. an ammonium and a sulphonate cation, onto this; and (c) partially saponifying neutralisation of the copolymer obtd.

Comonomer in (a) is e.g. (meth)acrylamide, acrylonitrile, (meth)acrylic acid (salt),

2-methacryloyloxyethyl diethylamine, etc. Ammonium cation is 2-methacryloyloxyethyl diethyl ammonium, and the sulphonate is e.g. 2-acrylamido-2-methylpropane sulphonate, etc.

ADVANTAGE - Is highly absorbent to aq. electrolyte solns. to improve water absorbency of paper towels and disposable diapers.

US 5439983A

Absorbing an aq. electrolyte soln. comprises contacting a graft copolymer formed by: (A) graft polymerising onto a first polymer of propylene at least one comonomer selected from e.g. (meth)acrylamide, acrylonitrile, (meth)acrylic acid, etc. (B) graft copolymerising an amphotolytic ion pair monomer having an ammonium cation and a sulphonate anion, where (i) the cation is 2-methacryloyloxyethylammonium; and (ii) the anion is e.g. 2-acrylamido-2-methylpropane sulphonate etc.; and (C) partially saponifying/neutralising the graft copolymer formed in (B) with an electrolyte soln. The comonomers and ion pair monomers are in amts. which are effective to produce a highly absorbent graft copolymer.

ADVANTAGE - A highly absorbent graft copolymer is formed improving water absorbency of paper towels and diapers.

CHOSEN-DRAWING: Dwg.0/0 Dwg.0/0

DERWENT-CLASS: A14 A18 A92 A96 D22 F07 P32 P34 S02

CPI-CODES: A12-W11D; D09-C03; D09-C06; F04-C01; F05-A06; F05-A07;

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L10: Entry 9 of 29

File: USPT

Apr 18, 1995

DOCUMENT-IDENTIFIER: US 5408019 A

TITLE: Cross-linked, water-absorbing polymer and its use in the production of hygiene items

Abstract Paragraph Left (1):

The invention relates to a cross-linked, water-absorbent polymer obtainable by the polymerization of a mixture consisting of a) 60-99%-wt. unsaturated, polymerizable monomers with acid groups which are neutralized to the extent of at least 30 mol-%, b) 0-37%-wt. monomers copolymerizable with a), c) 0.1-3.0%-wt. of a cross-linking agent and d) 0-10%-wt. of a water-soluble polymer, in which polymerization is conducted with a redox catalyst system containing formamidine sulfonic acid as reducing agent. The polymer is distinguished by a retention of greater than or equal to 28 g 0.9% aqueous NaCl-solution per 1 g of polymer, an absorption of greater than or equal to 26 g 0.9% aqueous NaCl-solution per 1 g of polymer at a load of 20 g/cm.sup.2 and a residual monomer content of less than 700 ppm, and preferably less than 500 ppm. The invention also relates to the use of this polymer in the production of hygiene articles.

Brief Summary Paragraph Right (8):

EP No. 0083022 describes water-absorbent polymers having an extremely high free swell capacity and a low tendency to agglomerate. These polymers are produced by cross-linking the polymer particles with glycidyl ethers.

Brief Summary Paragraph Right (14):

The known water-absorbent polymers do not provide the required property combination of high retention and high absorption under load, low content of residual monomers and small amounts of extractable portions.

Brief Summary Paragraph Right (18):

It is known to use formamidine sulfonic acid combined with peroxides to initiate the polymerization (cf. Houben-Weyl, "Methoden der organischen Chemie", volume 14/1, page 265); however, surprisingly, it was found that the polymerization in the presence of the redox-catalyst-system formamidine sulfonic acid/peroxide results in a very high conversion rate of the monomers into polymers and that the residual monomer content in the polymer amounts to <700 ppm. In addition, it could not be foreseen that the retention of the water-absorbent polymers is not deteriorated but--on the contrary--influenced positively, and that the polymers also exhibit a high absorption under load.

Detailed Description Paragraph Right (4):

The polymer was ground, sieved out to 100 to 850 .mu.m and mixed with 0.5% Aerosil 200. The water-absorbent polymer had the following properties:

Detailed Description Paragraph Right (10):

Acrylic acid (AcA) was copolymerized in aqueous solution in the presence of 1% triallyl amine with methacrylic acid (MAA), acrylamide (AA), 2-acrylamido-2-methylpropane sulfonic acid (AMPS) or dimethylaminopropyl acrylamide (DIMAPA). The monomer concentration amounted to 30%, the neutralization degree to 70%. 9 mg ascorbic acid, 3 g tertiary butyl hydroperoxide, and 500 mg formamidine sulfonic acid were used as catalyst system; Table III shows the copolymer composition and the properties of the water-absorbing polymers:

Detailed Description Paragraph Right (16):

The use of the water-absorbing polymers according to the present invention was tested in sandwiched constructions consisting of fluff and water-absorbing polymer. Round constructions consisting of 3 fluff layers and 2 layers of water-absorbing polymer

(diameter: 5.8 cm) were placed in the Buchner funnel determining the absorption under load. At a pressure load of 20 g/cm.² the constructions are allowed to suck 0.9% NaCl-solution for 150 minutes, then the absorption of the water-absorbent polymer is calculated as follows: ##EQU2##

CLAIMS:

7. A hygienic article including as an absorbent the cross-linked polymer according to claim 1.

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L10: Entry 15 of 29

File: USPT

May 10, 1994

DOCUMENT-IDENTIFIER: US 5310774 A

TITLE: Molecular weight degradation stabilized polymeric compositions

Brief Summary Paragraph Right (6):

In FR-A-2604444 the viscosity of a polyacrylamide for enhanced oil recovery is stabilised by adding at least 5% acrylamide monomer, base on the polymer. In JP-A-60/210657 it is proposed to stabilise polyacrylamide homopolymers, and copolymers of acrylamide with less than 50% of the monomers, that are to be used for purpose such as flocculation, paper-making, enhanced oil recovery, viscosifiers and soil improvers. This stabilisation is by the addition of at least 0.5% of a water soluble vinyl monomer and in the examples the monomers used are acrylamide (in an amount up to 7%) sodium acrylate, methacrylamide, acrylonitrile, dimethylaminoethyl acrylate and 2-acrylamido-2-methylpropane sulphonic acid (AMPS, U.S. Trade Mark).

Brief Summary Paragraph Right (30):

The polymer may be a substantial homopolymer of (meth)acrylamide, generally polyacrylamide homopolymer in which event it should be non-ionic. However, it may be anionic as a result of a small degree of hydrolysis of acrylamide groups or as a result of copolymerisation of the (meth)acrylamide with ethylenically unsaturated carboxylic or sulphonic monomer. Suitable monomers are any of the conventional water soluble anionic monomers such as (meth)acrylic acid (generally as a water soluble salt) or AMPS.

Brief Summary Paragraph Right (39):

The compositions of the invention can be used for a wide variety of purposes, depending on the particular polymer. For instance such uses can be selected from viscofication, enhanced oil recovery, flocculation, paper making, soil improvers, wallpaper and other adhesives, water shut-off and soil stabilisation and grouting, absorbents and so forth.

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L10: Entry 28 of 29

File: USPT

Dec 30, 1980

DOCUMENT-IDENTIFIER: US 4242242 A

TITLE: Highly absorbent fibers of rayon with sulfonic acid polymer incorporatedAbstract Paragraph Left (1):

Highly absorbent cellulosic fibers are made by incorporating therein from 2%-35% based on the weight of cellulose of a polymerized acrylamido-2-methylpropane sulfonic acid or a copolymer of acrylamido-2-methylpropane sulfonic acid with any one or combination of other polymerizable hydrophilic monomers such as acrylic acid, methacrylic acid, acrylonitrile and the like.

Brief Summary Paragraph Right (1):

This invention relates to highly absorbent fiber, for example, viscose rayon, hydroxypropylcellulose, and hydroxyethylcellulose, made from wood pulp or other cellulosic materials, which are useful in the production of nonwoven articles such as diapers, tampons, sanitary napkins, medical sponges, soil mulches, wiping cloths, and the like. Each of these applications requires a material having a high capacity for absorbing and retaining water and other aqueous fluids, particularly body fluids. Cellulosic fibers have found wide use in these and similar applications because of the hydrophilic nature of the cellulose molecule and the fibrous structure which contributes integrity, form, shape, wicking ability, and liquid retention to a nonwoven material.

Detailed Description Paragraph Right (45):

The so-called Demand Wettability Test (Lichstein, Bernard, International Nonwovens and Disposables Association, 2nd Annual Symposium on Non-woven Product Development, Mar. 5-6, 1974, Washington, D.C.), uses a novel apparatus which allows the measure of volume and rate of absorption of a fluid by maintaining the absorbent material at a zero hydrostatic head so that wetting occurs purely on demand by the absorbent material. Thus, the absorption of liquid occurs only by virtue of the ability of the absorbent material to demand liquid, with the flow of liquid abruptly stopping at the point of saturation.

Detailed Description Paragraph Center (20):

Solution Copolymerization of the Sodium Salt of AMPS Monomer with Acrylamide

CLAIMS:

1. A highly absorbent cellulosic fiber containing in a physical admixture with cellulose at least about 2% by weight based on the weight of the cellulose of a homopolymer consisting essentially of polymerized 2-acrylamido-2-methylpropane sulfonic acid monomers or the partial or complete alkali metal or ammonium salts thereof.
5. The highly absorbent fiber of claim 1 prepared by adding from about 2% to about 35% by weight based on the weight of the cellulose of said homopolymer to the viscose solution from which said fiber is made.
8. A highly absorbent cellulosic fiber containing in a physical admixture with cellulose at least about 2% by weight based on the weight of the cellulose of a copolymer comprising at least about 10% by weight of 2-acrylamido-2-methylpropane sulfonic acid monomers or the partial or complete alkali metal or ammonium salts thereof and at least one polymerizable, hydrophilic comonomer.
21. The highly absorbent fiber of claim 8 prepared by adding from about 2% to about 35% by weight based on the weight of the cellulose of said copolymer to the viscose solution from which said fiber is made.

23. A highly absorbent cellulose fiber containing in a physical admixture with cellulose at least about 2% by weight based on the weight of the cellulose of a copolymer consisting essentially of at least about 10% by weight of 2-acrylamido-2-methylpropane sulfonic acid monomers or the partial or complete alkali metal or ammonium salts thereof and at least one hydrophilic polymerizable comonomer capable of reacting with cellulose or other functional groups in said copolymer so as to insolubilize said copolymer.

27. The highly absorbent fiber of claim 23, prepared by adding from about 2% to about 35% by weight based on the weight of the cellulose of said copolymer to the viscose solution from which said fiber is made.

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L10: Entry 23 of 29

File: USPT

May 12, 1992

DOCUMENT-IDENTIFIER: US 5112391 A

TITLE: Method of forming ore pellets with superabsorbent polymer

Brief Summary Paragraph Right (6):

Our invention, on the other hand, provides for the use of materials which can be handled easily, either in combination with one another, or added incrementally in any order, and which materials include some of the materials of the prior art, but also include, importantly, a superabsorbent polymer obtained from cross-linked polyacrylate absorbents.

Brief Summary Paragraph Right (7):

These cross-linked polyacrylate absorbents are described, for example, in U.S. Pat. No. 4,295,987 and U.S. Pat. No. 4,654,939, both of which are incorporated herein by reference. These superabsorbent polymers are capable of forming hydro-gels and also capable of absorbing a very large percentage of their weight in water. The preferred superabsorbent polymers of our invention are the so-called superabsorbent fines which are very small particle sized hydro-gel materials normally recovered from a superabsorbent manufacturing process, but which have such small particle size that they cannot be properly used, for example, in water absorption processes, for example, in baby diapers and the like.

Brief Summary Paragraph Right (12):

The preferred water-soluble vinyl addition polymers are chosen from the group consisting of homopolymers of acrylic acid, copolymers of acrylic acid with at least one of the monomers acrylamide and AMPS, or homopolymers of acrylamide and copolymers of acrylamide with at least one of the monomers acrylic acid and AMPS.